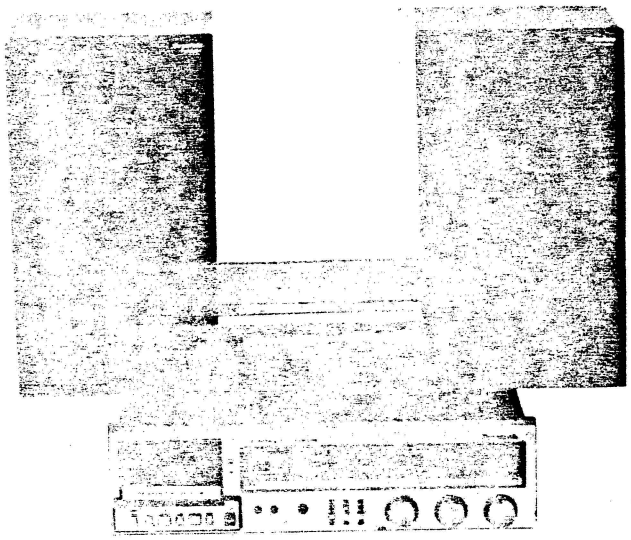
ORDER NO. TSD-7912-653

Service Manual

3 in 1 Stereo Music Center

SE-2510

FM STEREO/FM/AM RADIO WITH CASETT TAPE DECK AND RECORD CHANGER



Specifications

Power Output..... 2.4 watts per channel minimum continuous RMS power at 8Ω from 100 Hz to 15 kHz with no more than 5% total harmonic distortion.

Input Sensitivity and Impedance:
- Mic..... 1.0 mV, 1 kΩ
- Aux..... 250 mV, 50 kΩ

Tone Controls:
- Bass..... ±10 dB at 100 Hz
- Treble..... ±12 dB at 10 kHz

FM TUNER SECTION
- Frequency Range..... 88 MHz ~ 108 MHz
- Usable Sensitivity..... 5 μV (S/N 30 dB Mod. 30%)
- Harmonic Distortion:
  - Mono..... 0.4% (at 1 kHz Mod. 30%)
  - Stereo..... 0.5% (at 1 kHz Mod. 30%)
- Signal/Noise Ratio..... 56 dB (at 1 kHz 60 dB 30%)
- Stereo Separation..... 30 dB (at 1 kHz 60 dB 30%)
- Image Ratio..... 35 dB (98 MHz)

AM TUNER SECTION
- Frequency Range..... 525 kHz ~ 1605 kHz
- Sensitivity..... 150 μV/m (1 MHz)
- Image Ratio..... 38 dB (1 MHz)

TAPE DECK SECTION
- Recording System..... AC Bias (47 kHz)
- Erasing System..... AC Erase (47 kHz)
- Tape Speed..... 4.75 cm/sec. (1-7/8 i.p.s.)
- Frequency Response..... 70 Hz ~ 10 kHz
- Wow and Flutter..... 0.15% (WRMS)

RECORD CHANGER SECTION
- Changer System..... Rim-Drive Auto Changer
- Turntable Size..... 28 cm (11")
- Turntable Speed..... 2 Speed (33-1/3, 45 r.p.m.)
- Phonomotor..... AC Motor
- Cartridge..... Ceramic
- Stylus..... Diamond

AC POWER SUPPLY..... AC 120V, 60 Hz

POWER CONSUMPTION.... 35W

DIMENSIONS (W × H × D).. 526 mm × 441 mm × 196 mm (20-23/32") (17-3/8") × (7-23/32")

WEIGHT..... 8.15 kg (18 lbs.)

SPEAKER SYSTEM..... SB-380

* Specifications are subject to change without notice for further improvement.

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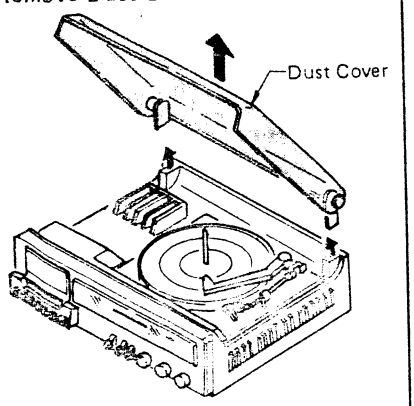
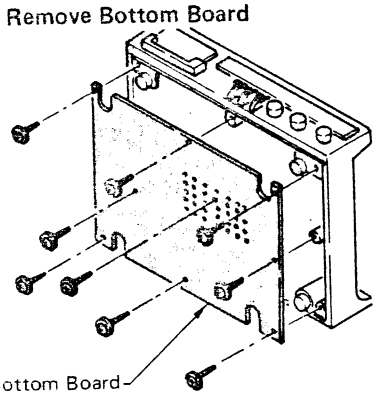
DISASSEMBLY INSTRUCTIONS

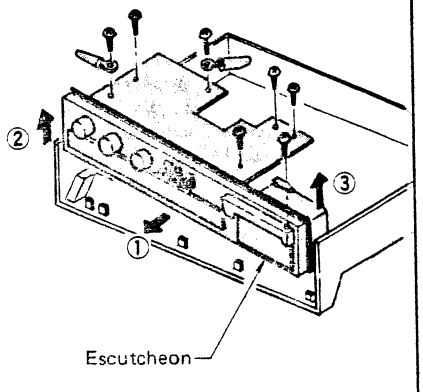
❶ Remove Dust Cover



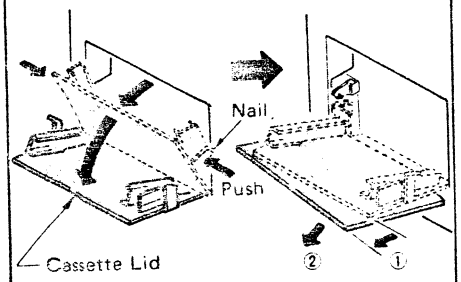
❷ Remove Bottom Board



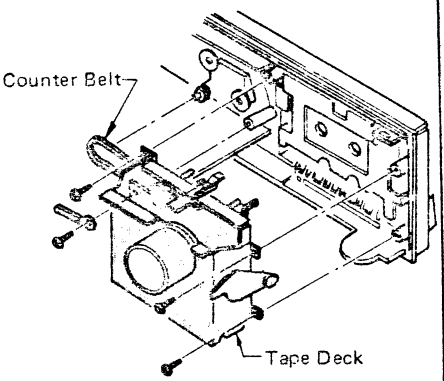
❸ Remove Escutcheon



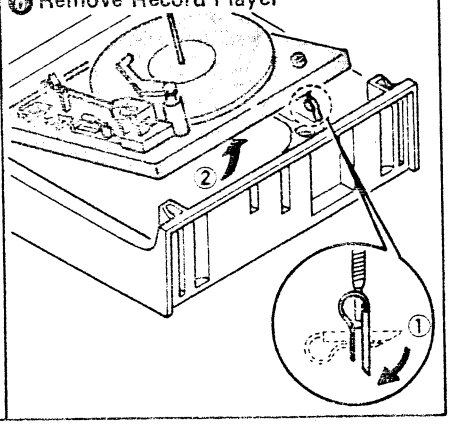
❹ Remove Cassette Lid



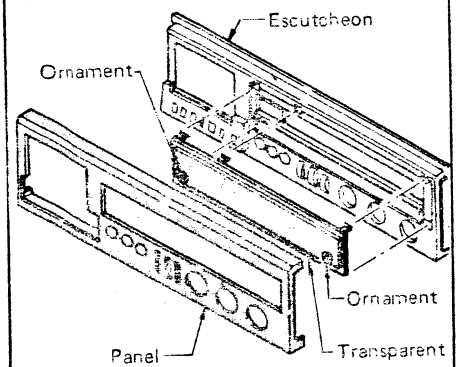
❺ Remove Tape Deck and Counter Belt



❻ Remove Record Player



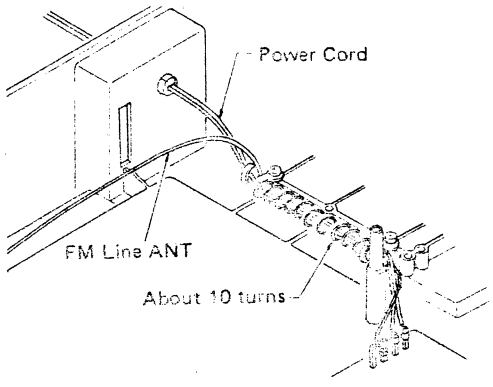
❼ Replace Transparent Cover



- **To Replace Parts on P.C. Board** ..... Refer to ❶ ~ ❸.
- **To Remove Tape Deck** ..... Refer to ❶ ~ ❺.
- **To Remove Record Player** ..... Refer to ❶, ❷, ❻.
- **To Replace Transparent Cover** ..... Refer to ❶ ~ ❸, ❼.

SERVICING AID

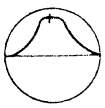
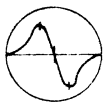
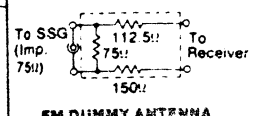
■ **Disposition of FM Line Antenna**



ALIGNMENT INSTRUCTIONS –1

■ Radio

Notes:
1. Volume Control ..... Maximum (AM-IF and RF, FM-RF); Minimum (FM-IF)
2. Treble Control ..... Center
3. Bass Control ..... Center
4. Balance Control ..... Center
5. Function Selector ..... AM, FM MONO, FM AUTO
6. Power Switch ..... ON
7. Output of signal generator should be no higher than necessary to obtain output reading.
8. Make certain that speaker system is connected to the receiver when aligning. (or use 8Ω dummy load resistors).

STEP	SIGNAL GENERATOR OR SWEEP GENERATOR		RADIO DIAL SETTING	INDICATOR (VTVM or SCOPE)	ADJUST	REMARKS
	CONNECTION	FREQUENCY				
AM-IF AND RF ALIGNMENT						
1	Fashion loop of several turns of wire and radiate signal into loop of receiver.	455 kHz 30% Mod with 400 Hz	Point of non-interference	Output meter across speaker jack (L) (Imp. 8Ω)	T201 (AM CFT) T202 (AM IFT)	Adjust for maximum output
2		550 kHz 30% Mod with 400 Hz	550 kHz		L201 (ANT Coil) L202 (OSC Coil)	Adjust for maximum output by sliding coil (L201) along ferrite core.
3		1500 kHz 30% Mod with 400 Hz	1500 kHz		CT201 (ANT Trimmer) CT202 (OSC Trimmer)	Adjust for maximum output. Repeat steps (2) and (3).
Note: Cement antenna coil (L201) with wax after completing alignment.						
FM-IF ALIGNMENT						
1	High side through 1pF to TP101 (IC101) and TP102 (ground)	10.7 MHz (400 kHz SWP.)	Point of non-interference	Connect vert. amp. input of scope between point TP201 and TP203 (ground)	T101 (FM 1st IFT) (Refer to **Note**)	Adjust T101 for maximum amplitude and symmetrical curve. 
2					T203 (FM Disc. IFT)	Adjust for maximum amplitude and proper linearity between about ±100 kHz markers. 
Note: Before aligning step 1, turn the cores of T203 fully counterclockwise.						
FM-RF ALIGNMENT						
1	Connect to EXT. FM antenna terminal through Dummy antenna. Common to chassis.	90 MHz 30% Mod. with 400 Hz	90 MHz	Output meter across speaker jack (L) (Imp. 8Ω)	L101 (FM ANT Coil) L102 (FM OSC Coil)	Adjust for maximum output.
2	 FM DUMMY ANTENNA	106 MHz 30% Mod. with 400 Hz	106 MHz		CT101 (FM ANT Trimmer) CT102 (FM OSC Trimmer)	Adjust for maximum output. Repeat steps (1) and (2).
Note: As three output readings will be present, adjustments must be made at center frequency.						

ALIGNMENT INSTRUCTIONS –2

■ FM Stereo Alignment

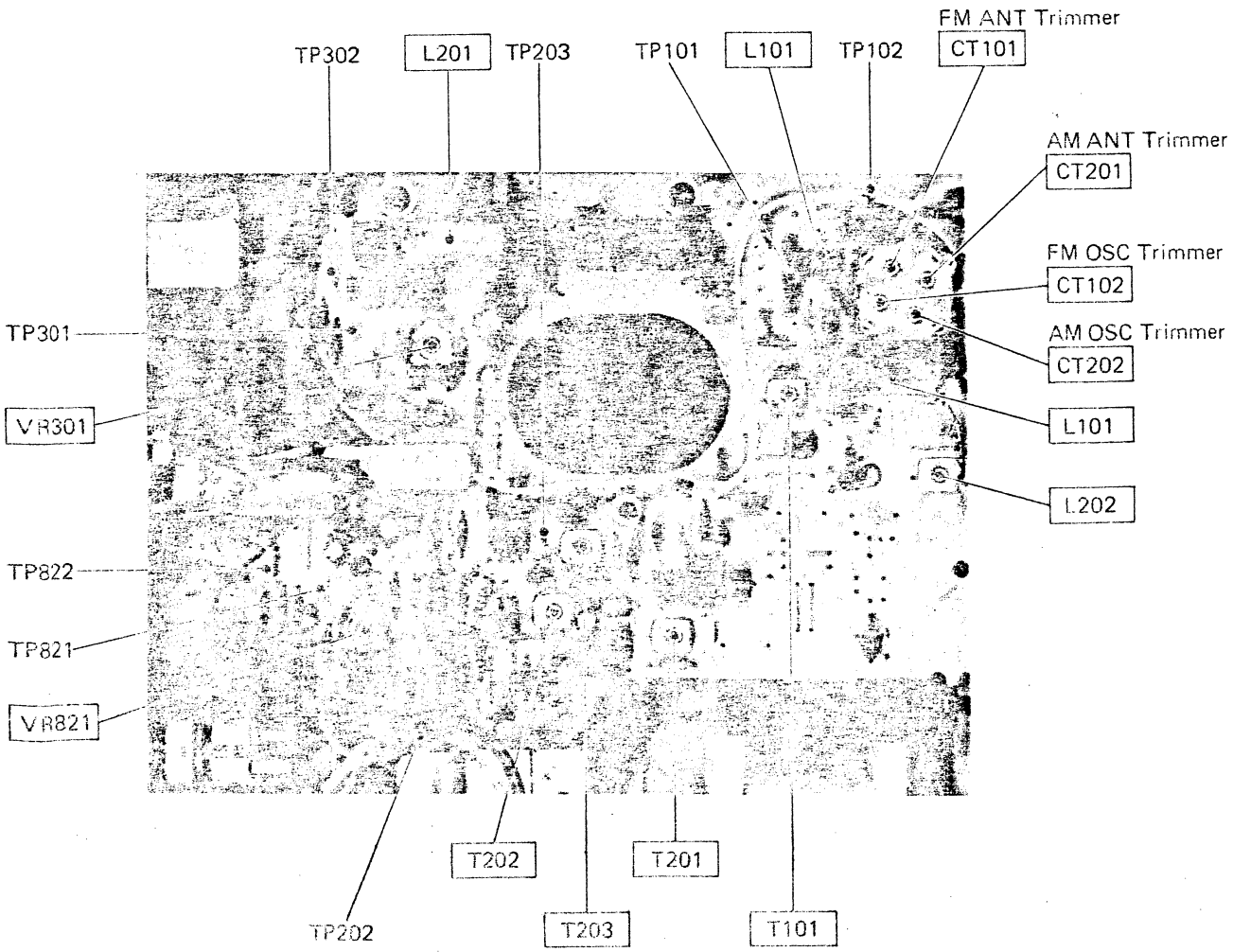
Notes: Tuner:
Volume Control ..... Audible level of speaker sound
Treble Control ..... MIN
Bass Control..... Center
Band Selector ..... FM AUTO
Balance Control..... Center

EQUIPMENT CONNECTION	ADJUST	REMARKS
Connect frequency counter to TP301 and TP302 (ground) at no signal condition.	VR301	Adjust VR301 for 19 kHz ± 100 Hz on frequency counter reading.

■ Tuning LED Alignment

DC VTVM CONNECTION	SIGNAL	ADJUST	REMARKS
TP821 (–) and TP822 (+)	No Signal	VR821	Adjust VR821 for 400 mV ±0.05V on DC VTVM reading.

ALIGNMENT POINTS (RADIO)



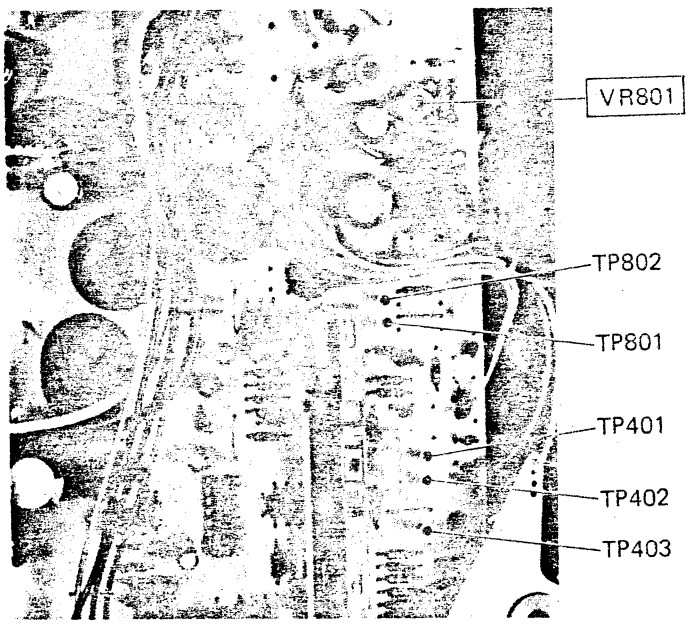
ALIGNMENT INSTRUCTIONS –3

■ Tape Deck

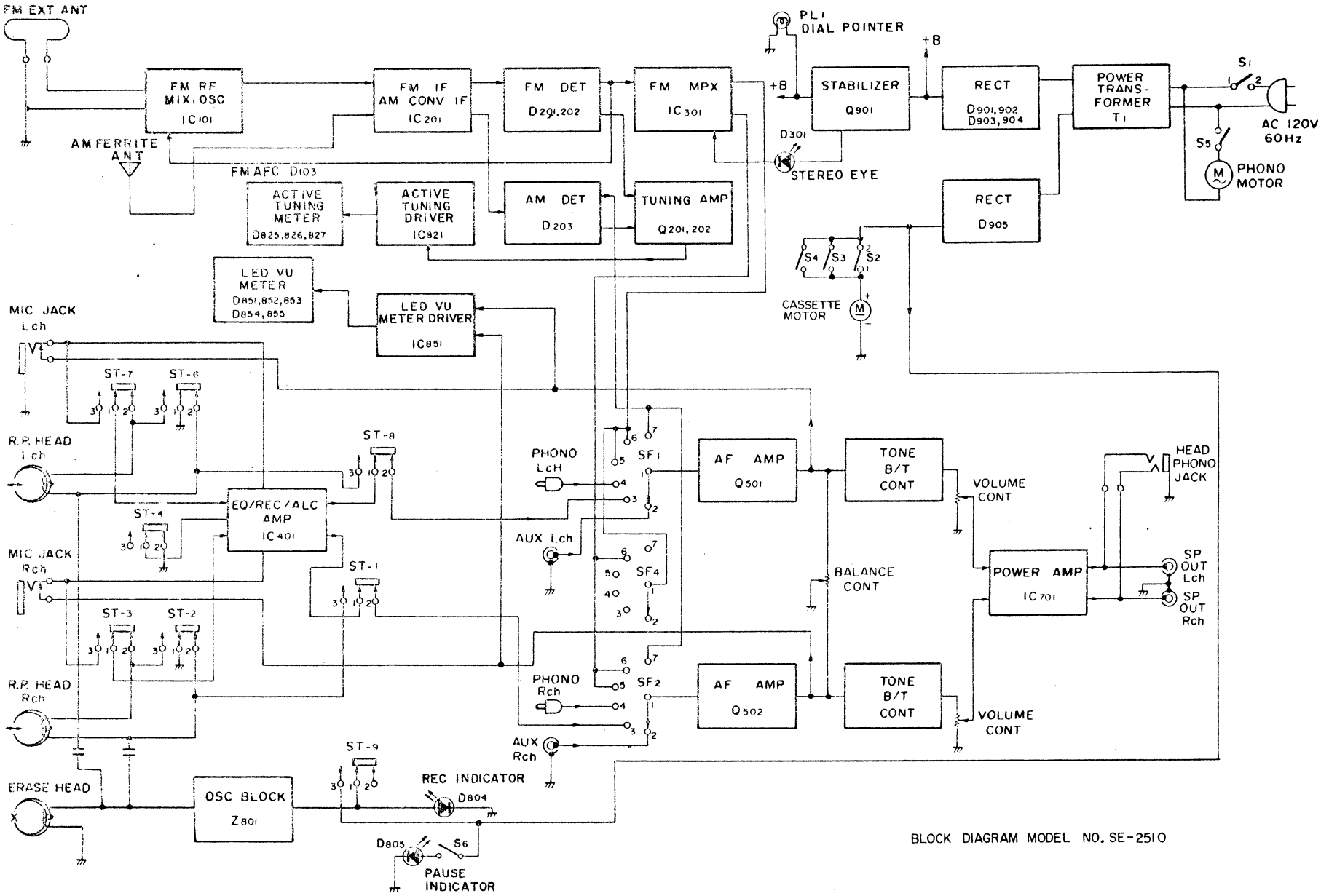
Note:
1. Function Selector ..... Tape
2. Tape Deck Condition ..... Recording Condition
3. Volume Control ..... Minimam

STEP	ALIGNMENT ITEM	VTVM CONNECTION		ADJUST	REMARKS
		Positive	Negative		
1	RECORDING BIAS	TP401 (L)	TP403	VR801	Adjust VR801 for 3.3 mV on VTVM reading
		TP402 (R)	TP403		
2	ERASE BIAS	TP801	TP802	———	Confirm the reading on VTVM 60 ~ 105 mV
3	R/P HEAD AZIMUTH	SPEAKER TERMINAL	SPEAKER TERMINAL	R/P HEAD SCREW	Adjust screw for max indication VTVM.

ALIGNMENT POINTS (TAPE DECK)



BLOCK DIAGRAM

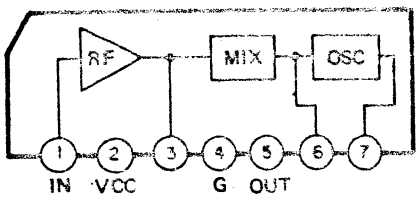


BLOCK DIAGRAM MODEL NO. SE-2510

IC BLOCK DIAGRAMS

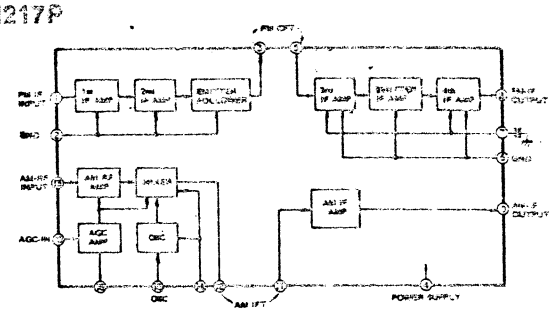
IC101

AN7213



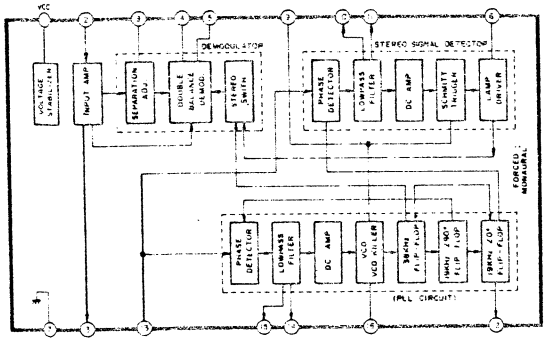
IC201

AN217P



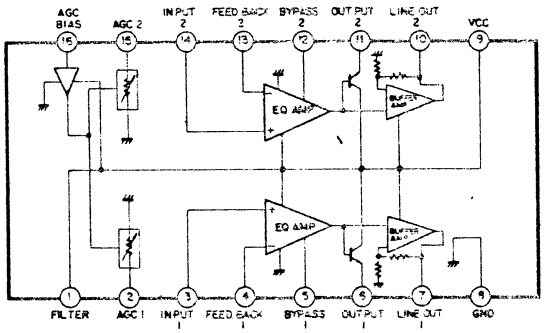
IC301

AN7410



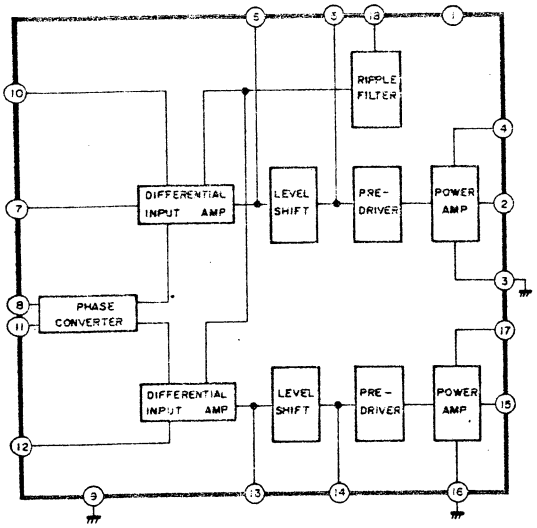
IC401

M51301P



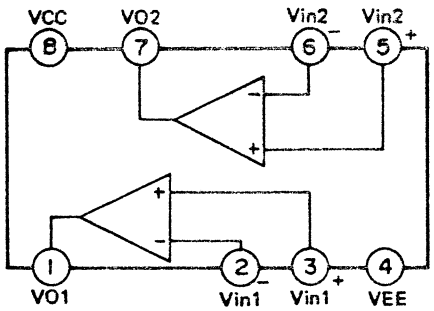
IC701

AN7146H



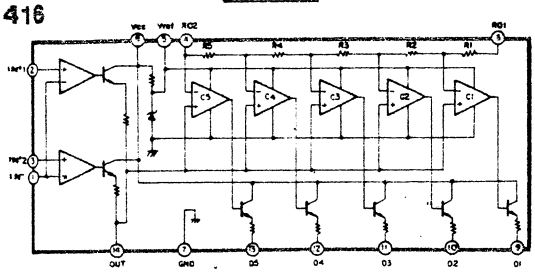
IC821

AN6552

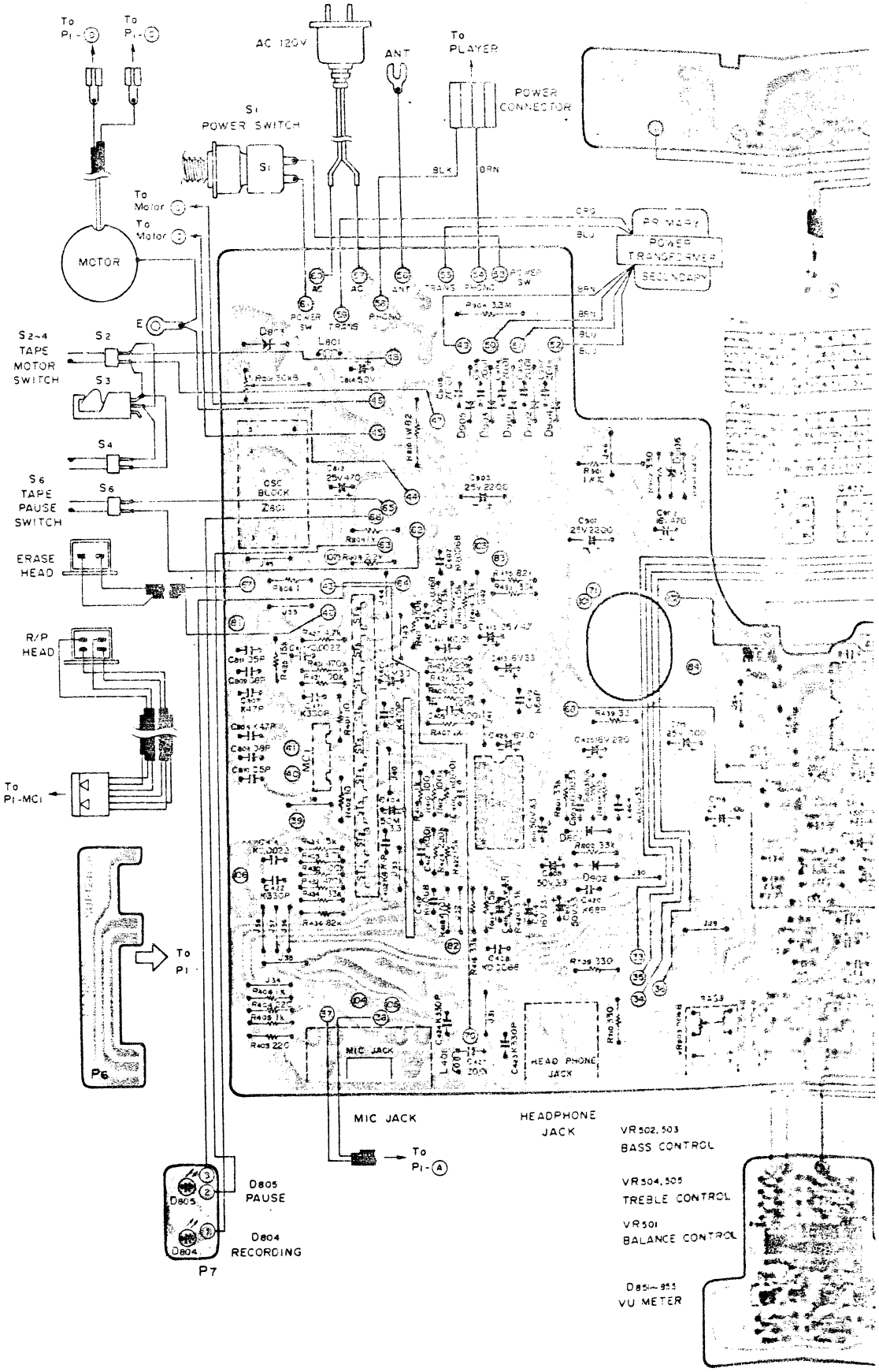


IC851

LB1416

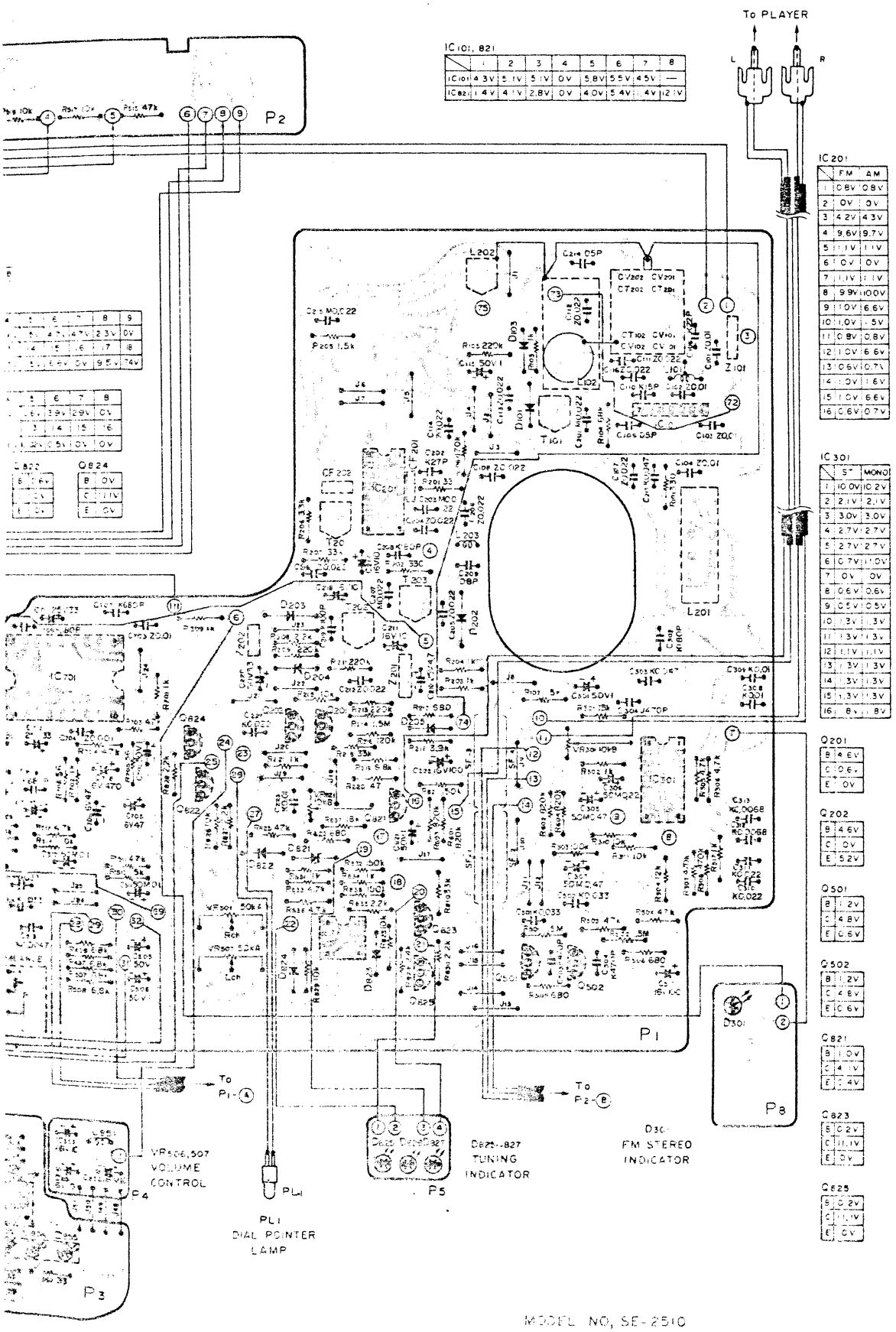


SE-2510


To P1-③
To P1-④
AC 120V
ANT
To PLAYER
POWER CONNECTOR
S1 POWER SWITCH
S1
To Motor
To Motor
MOTOR
BLK
BRN
POWER TRANSFORMER
SECONDARY
PRIMARY
S2~4 TAPE MOTOR SWITCH
S2
S3
S4
S6 TAPE PAUSE SWITCH
S6
ERASE HEAD
R/P HEAD
To P1-MC1
OSC BLOCK
Z801
To P1
P6
MIC JACK
HEAD PHONE JACK
To P1-Ⓐ
D805 PAUSE
D804 RECORDING
P7
VR502, 503 BASS CONTROL
VR504, 505 TREBLE CONTROL
VR501 BALANCE CONTROL
D851~855 VU METER

SE-2510

WIRING CONNECTION



IC101, 821

	1	2	3	4	5	6	7	8
IC101	4.3V	5.1V	5.1V	0V	5.8V	5.5V	4.5V	—
IC821	1.4V	4.1V	2.8V	0V	4.0V	5.4V	4V	2.1V

IC201

	FM	AM
1	0.8V	0.8V
2	0V	0V
3	4.2V	4.3V
4	9.6V	9.7V
5	1.1V	1.1V
6	1.0V	0V
7	1.1V	1.1V
8	9.9V	10.0V
9	1.0V	6.6V
10	1.0V	5V
11	0.8V	0.8V
12	1.0V	6.6V
13	0.6V	0.7V
14	1.0V	1.6V
15	1.0V	6.6V
16	0.6V	0.7V

IC301

	ST	MONO
1	10.0V	10.2V
2	2.1V	2.1V
3	3.0V	3.0V
4	2.7V	2.7V
5	2.7V	2.7V
6	0.7V	11.0V
7	0V	0V
8	0.6V	0.6V
9	0.5V	0.5V
10	1.2V	3V
11	3.1V	3V
12	1.1V	1.1V
13	3V	3V
14	3V	3V
15	3.1V	3V
16	8V	8V

Q201

B	4.6V
C	0.6V
E	0V

Q202

B	4.6V
C	0V
E	5.2V

Q501

B	1.2V
C	4.8V
E	0.6V

Q502

B	1.2V
C	4.8V
E	0.6V

Q821

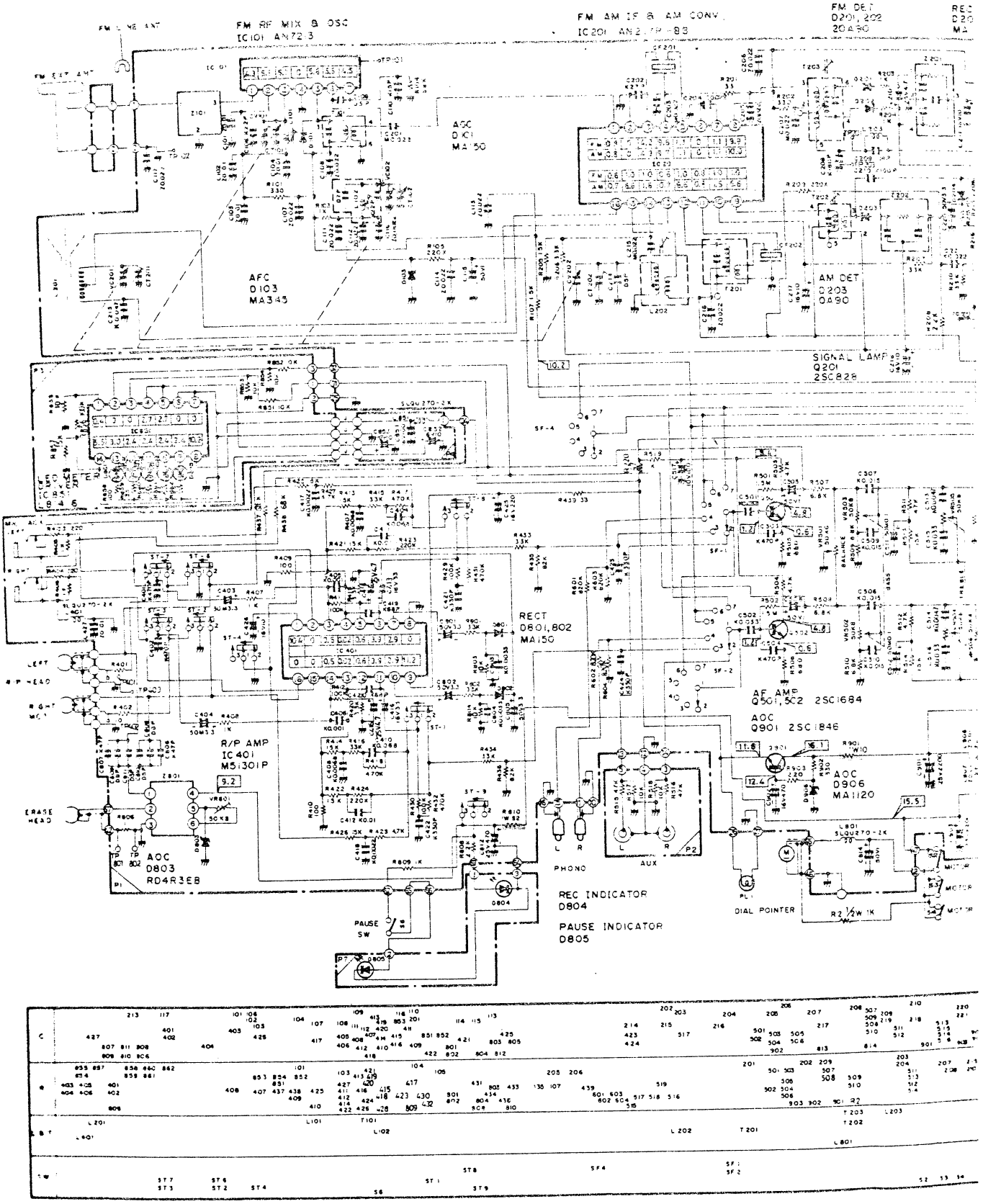
B	1.0V
C	4.1V
E	1.4V

Q823

B	0.2V
C	11.1V
E	0V

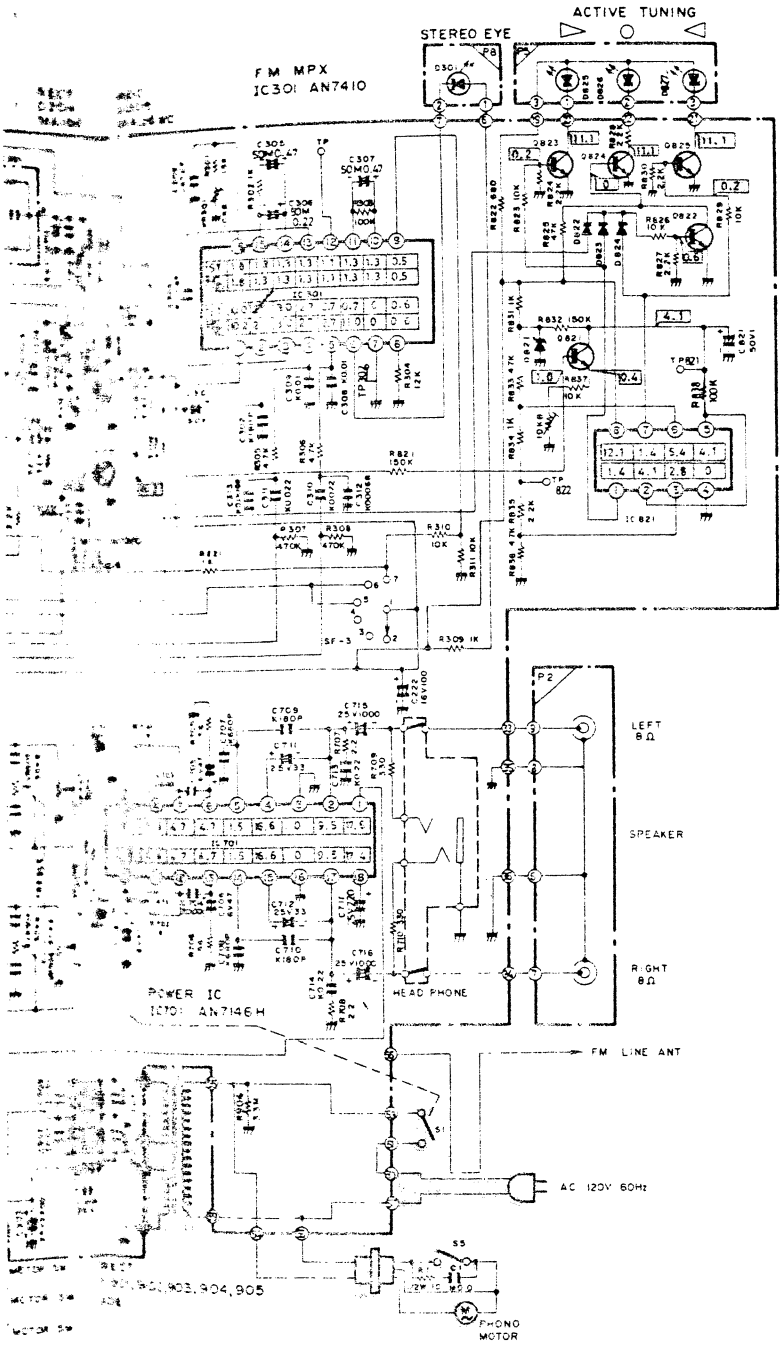
Q825

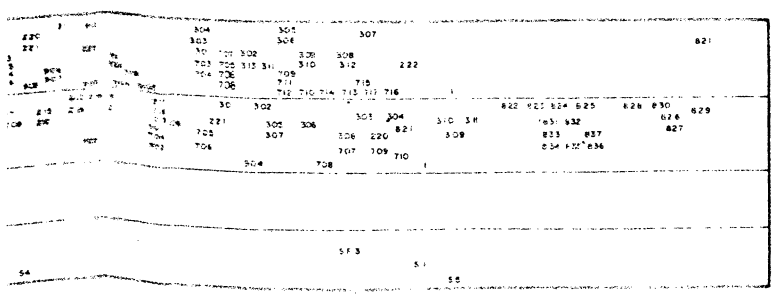
B	0.2V
C	11.1V
E	0V



• This diagram might be modified without notice for further development of technology.

TIC DIAGRAM





NOTE

1) PL1 DIAL POINTER LAMP
2) S1 POWER SWITCH in "OFF" position
S2,S3,S4 TAPE MOTOR SWITCH in "OFF" position
S5 PHONO MOTOR SWITCH in "OFF" position
S6 TAPE PAUSE SWITCH in "OFF" position
ST1-9 REC/PLAY SELECTOR SWITCH in "PLAY" position
SF1-4 FUNCTION SELECTOR SWITCH in "AUX" position
(1 COMMON 2 AUX 3 TAPE/MIC 4 PHONO 5 FM AUTO 6 FM MONO 7 AM)
3) LETTER
J, K, M, Z and P indicate tolerance of Capacitance as follows
J: ±5%, K: ±10%, M: ±20%, Z: +80% −20%, P: +100% −0%
4) DC voltage are to be measured with VTVM under no signal condition in "AM" or "FM" position

IMPORTANT SAFETY NOTICE

THE SHADED AREA ON THIS SCHEMATIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR SAFETY.

FOR CONTINUED PROTECTION IT IS ESSENTIAL THAT ONLY MANUFACTURER'S SPECIFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE SHADED AREAS OF THE SCHEMATIC.

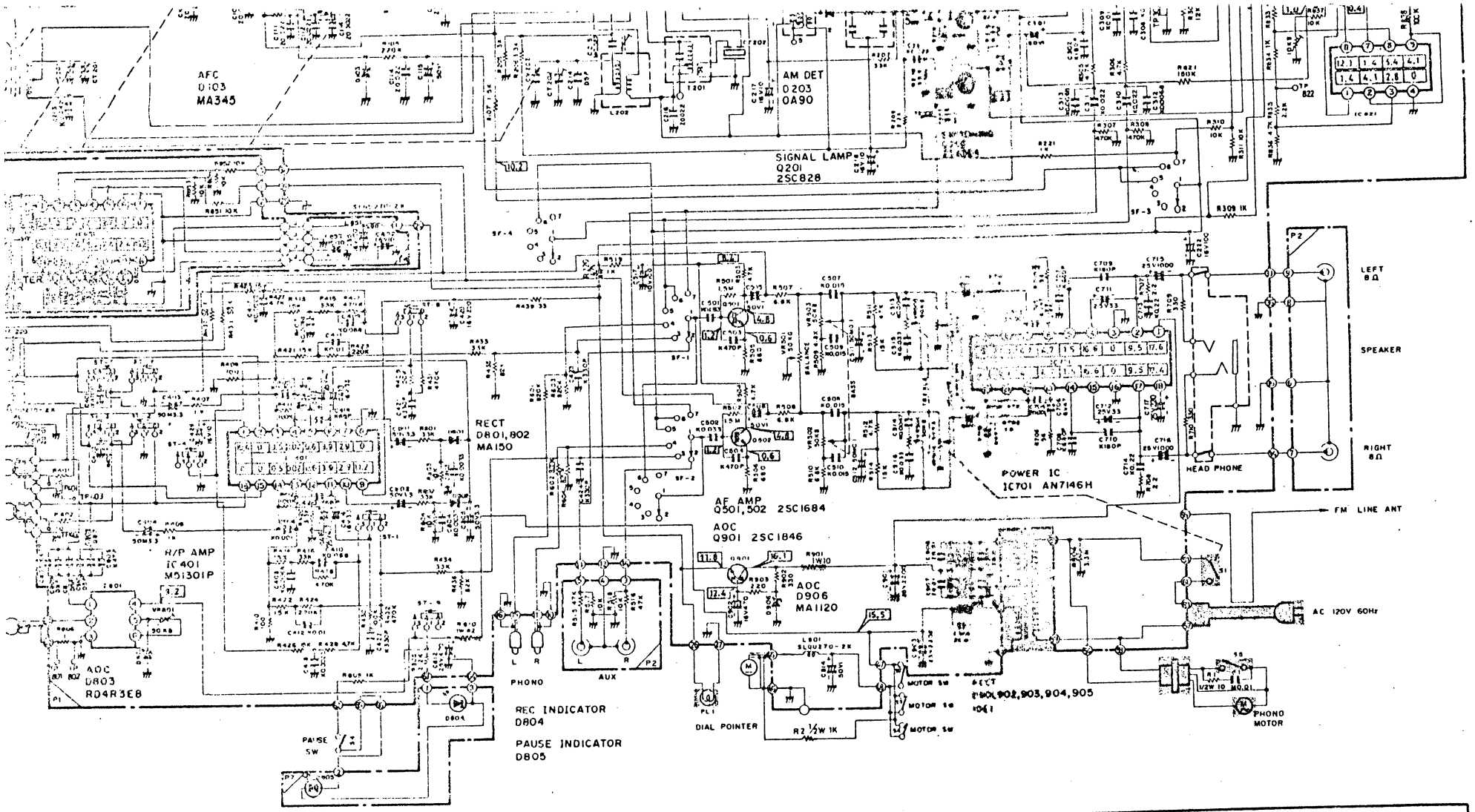


diagram might be modified without notice for further development of technology.

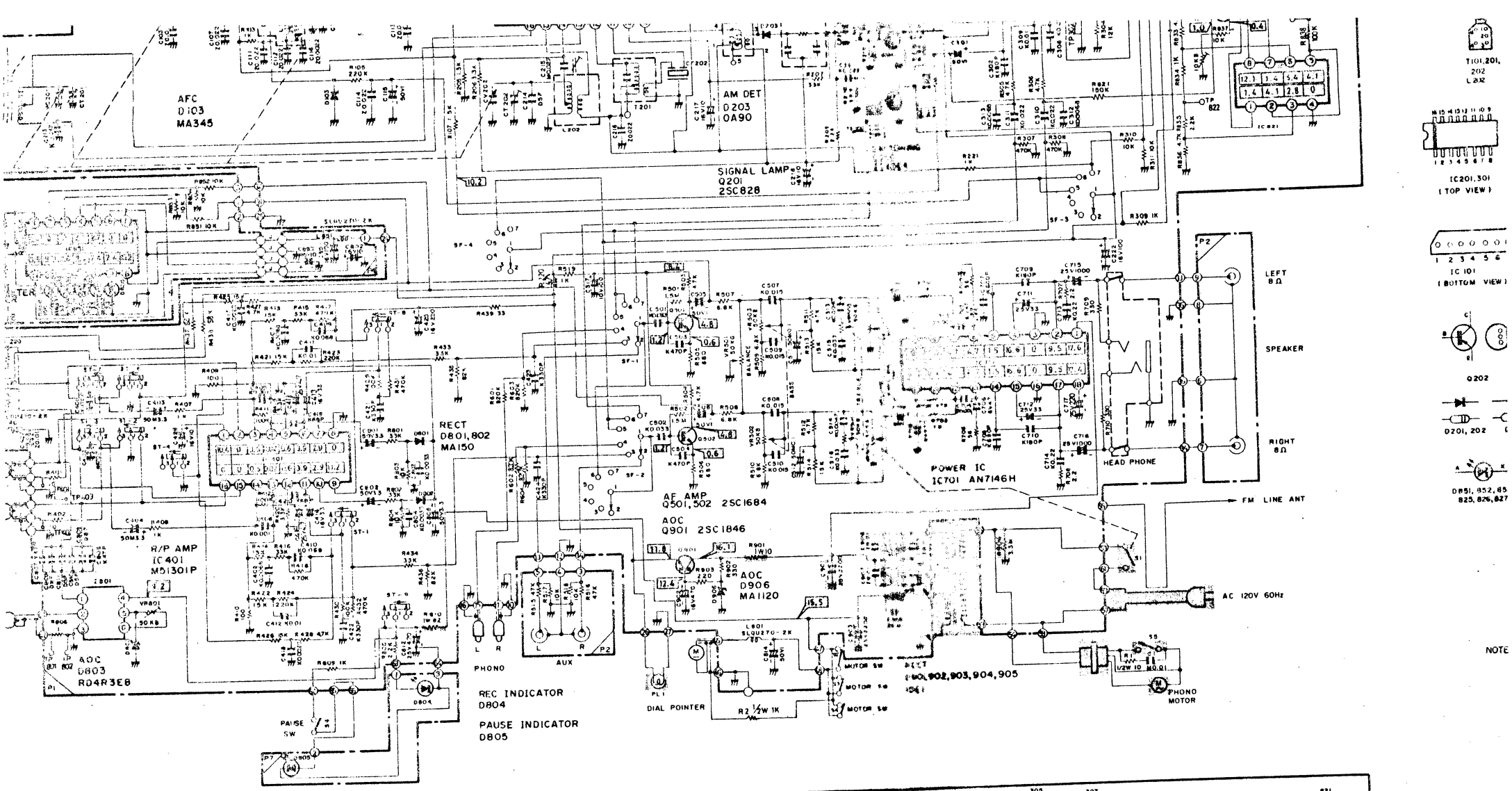
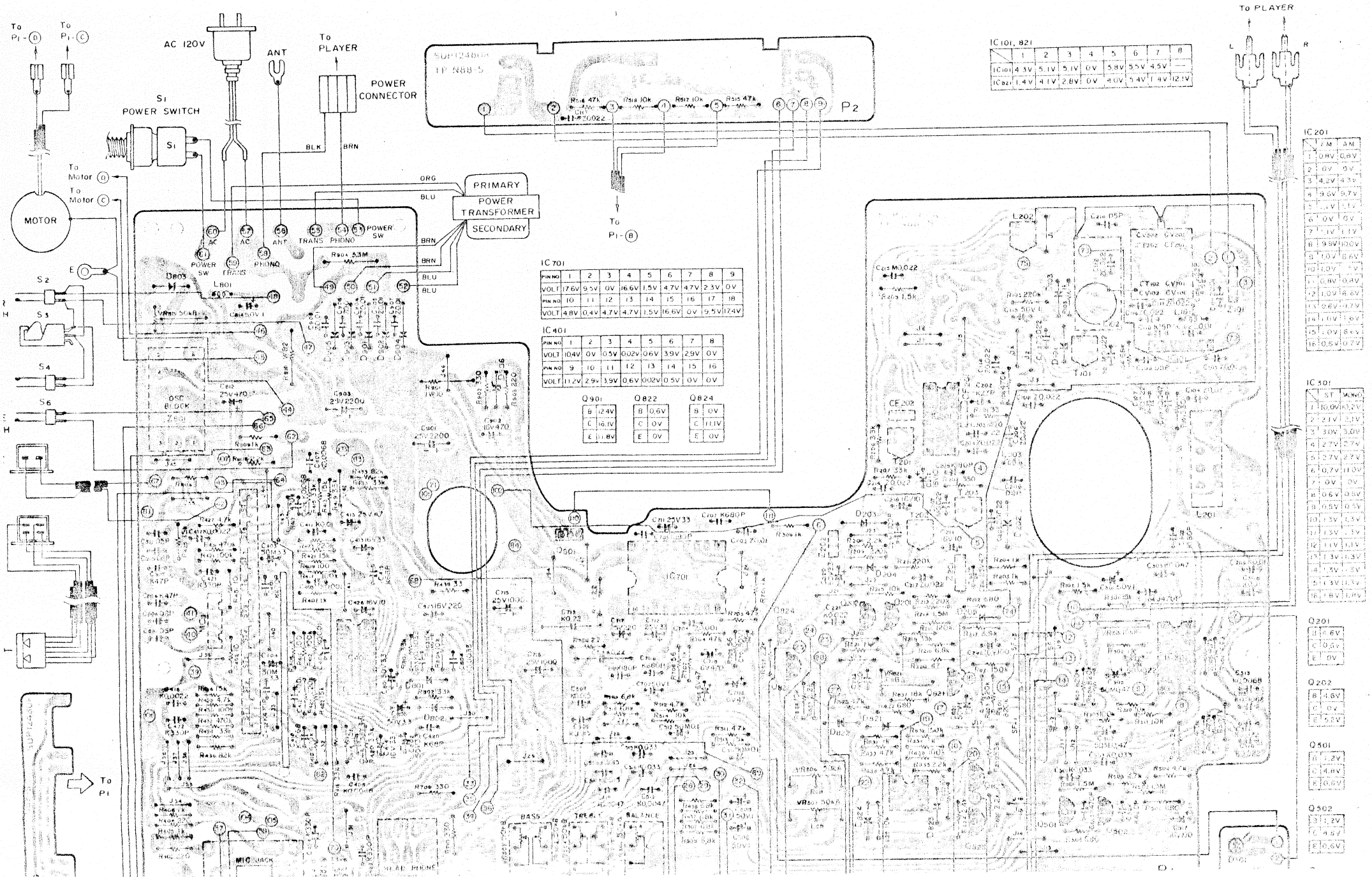


Diagram might be modified without notice for further development of technology.

CIRCUIT BOARD AND WIRING CONNECTION



IC701									
PIN NO	1	2	3	4	5	6	7	8	9
VOLT	17.6V	9.5V	0V	16.6V	1.5V	4.7V	4.7V	2.3V	0V
PIN NO	10	11	12	13	14	15	16	17	18
VOLT	4.8V	0.4V	4.7V	4.7V	1.5V	16.6V	0V	9.5V	17.4V

IC401								
PIN NO	1	2	3	4	5	6	7	8
VOLT	10.4V	0V	0.5V	0.02V	0.6V	3.9V	2.9V	0V
PIN NO	9	10	11	12	13	14	15	16
VOLT	11.2V	2.9V	3.9V	0.6V	0.02V	0.5V	0V	0V

Q901	
B	12.4V
C	16.1V
E	11.8V

Q822	
B	0.6V
C	0V
E	0V

Q824	
B	0V
C	11.1V
E	0V

IC101, 821									
	1	2	3	4	5	6	7	8	
IC101	4.3V	5.1V	5.1V	0V	5.8V	5.5V	4.5V	—	
IC821	1.4V	4.1V	2.8V	0V	4.0V	5.4V	1.4V	12.1V	

IC201		
	FM	AM
1	0.8V	0.8V
2	0V	0V
3	4.2V	4.3V
4	9.6V	9.7V
5	1V	1.1V
6	0V	0V
7	1V	1.1V
8	9.9V	10.0V
9	1.0V	0.6V
10	1.0V	1V
11	0.8V	0.4V
12	1.0V	0.6V
13	0.6V	0.7V
14	1.0V	1.6V
15	0V	0.6V
16	0.5V	0.7V

IC301		
	ST	MONO
1	10.0V	0.2V
2	2.1V	2.1V
3	3.0V	3.0V
4	2.7V	2.7V
5	2.7V	2.7V
6	0.7V	11.0V
7	0V	0V
8	0.6V	0.6V
9	0.5V	0.5V
10	1.3V	1.3V
11	1.1V	1.1V
12	1.1V	1.1V
13	1.3V	1.3V
14	1.3V	1.3V
15	1.3V	1.3V
16	1.8V	1.8V

Q201	
B	1.6V
C	0.6V
E	0V

Q202	
B	1.6V
C	0V
E	1.2V

Q501	
B	1.2V
C	4.4V
E	0.6V

Q502	
B	1.2V
C	4.5V
E	0.6V